

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

Declaration, Power Of Attorney and Petition

Page 1 of 3

JAN 16 2004

WE (I) the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

PREVENTION OF Bt RESISTANCE DEVELOPMENT

the specification of which

☒ is attached hereto.

☐ was filed on _____ as

Application Serial No. _____

and amended on _____

☒ was filed as PCT international application

Number PCT/EP 90/00905

on May 30, 1990

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information material to the examination of this application in accordance with Section 1.56(a) of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under Section 119 of Title 35 United States Code, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Application No.	Country	Day/Month/Year	Priority Claimed
89401499.2	UNITED KINGDOM	31/05/1989	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No
_____	_____	_____	<input type="checkbox"/> Yes <input type="checkbox"/> No

We (I) hereby claim the benefit under Section 120 of Title 35 United States Code, of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Section 112 of Title 35 United States Code, We (I) acknowledge the duty to disclose material information as defined in Section 1.56(a) of Title 37 Code of Federal Regulations, which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

Application Serial No.	Filing Date	Status (pending, patented, abandoned)
<u>PCT/EP 90/00905</u>	<u>MAY 30, 1990</u>	

I hereby appoint the following attorneys and agent(s) to prosecute said application and to transact all business in the Patent and Trademark Office connected therewith and to file, prosecute and to transact all business in connection with international applications directed to said invention:

William L. Mathis	17.337	Norman H. Stepano	22.716	Robert G. Mukai	28.531
Peter H. Smolka	15.913	Ronald L. Grudziecki	24.970	George A. Hovanes, Jr.	28.223
Robert S. Swecker	19.885	Frederick G. Michaud, Jr.	26.003	James A. LaBarre	28.632
Platon N. Mandros	22.124	Alan E. Kopecki	25.813	S. Joseph Goss	28.510
Benton S. Duffen, Jr.	22.030	Regis E. Sluzer	26.999	David D. Reynolds	29.273
Joseph R. Magnone	24.239	Samuel C. Miller, III	27.360	R. Danny Huntington	27.903
Joel M. Freed	25.101	Ralph L. Freeland, Jr.	16.110		

and:

Address all correspondence to:

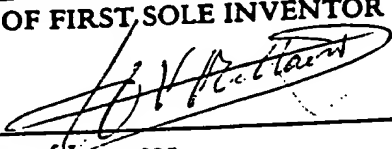
Burns, Doane, Swecker & Mathis
George Mason Building
Washington and Prince Streets
P. O. Box 1404
Alexandria, Virginia 22313-1404

at (703) 836-6620.

Address all telephone calls to:

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

VAN MELLAERT Herman
NAME OF FIRST SOLE INVENTOR


Signature of Inventor

26/11/90
Date

Residence: Wilselsesteenweg 19
B-3200 LEUVEN (Belgium)

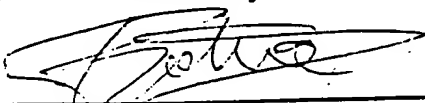
Citizenship: Belgian

Post Office Address: the same

DOCKETED
filed 10/22/95

BOTTERMAN Johan

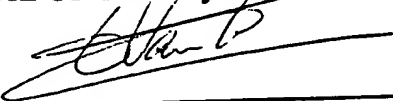
NAME OF SECOND JOINT INVENTOR


Signature of Inventor

26/11/1990.
Date

VAN RIE Jeroen


NAME OF THIRD JOINT INVENTOR


Signature of Inventor

Nov. 26, 1990.
Date

JOOS Henk

NAME OF FOURTH JOINT INVENTOR


Signature of Inventor

26 Novembre 1990
Date

NAME OF FIFTH JOINT INVENTOR

Signature of Inventor

Date

Residence: Het Wijngaardeke 5
B. 9721 ZEVEERGEM-DE PINTE (Belgium)

Citizenship: Belgian

Post Office Address: the same

Residence: Gravin Johannalaan 10
B 9900 EEKLO (Belgium)

Citizenship: Belgian

Post Office Address: the same

Residence: Oostmolen Zuid 5
B-9880 AALTER (Belgium)

Citizenship: Belgian

Post Office Address: the same

Residence: _____

Citizenship: _____

Post Office Address: _____



US006172281B1

(12) **United States Patent**
Van Mellaert et al.

(10) **Patent No.:** **US 6,172,281 B1**
 (45) **Date of Patent:** ***Jan. 9, 2001**

(54) **RECOMBINANT PLANT EXPRESSING NON-COMPETITIVELY BINDING BT INSECTICIDAL CRYSTAL PROTEINS**

(75) Inventors: **Herman Van Mellaert**, Leuven; **Johan Botterman**, Zevegem-de Pinte; **Jeroen Van Rie**, Eeklo; **Henk Joos**, Aalter, all of (BE)

(73) Assignee: **Aventis CropScience N.V.** (BE)

(*) Notice: Under 35 U.S.C. 154(b), the term of this patent shall be extended for 0 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **09/176,320**

(22) Filed: **Oct. 22, 1998**

Related U.S. Application Data

(62) Division of application No. 08/465,609, filed on Jun. 5, 1995, now Pat. No. 5,866,784, which is a continuation of application No. 08/173,274, filed on Dec. 23, 1993, now abandoned, which is a continuation of application No. 07/640,400, filed as application No. PCT/EP90/00905 on May 30, 1990.

(30) **Foreign Application Priority Data**

May 31, 1989 (GB) 89401499

(51) Int. Cl.⁷ C12N 15/82; A01H 5/00

(52) U.S. Cl. 800/302; 800/279

(58) Field of Search 435/69.1, 320.1, 435/419, 468; 536/23.71; 800/279, 302

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,500,365 3/1996 Fischhoff et al. 435/240.4
 5,866,784 * 2/1999 Van Mellaert et al. 800/205
 5,908,970 * 6/1999 Van Mellaert et al. 800/205

FOREIGN PATENT DOCUMENTS

0192319 8/1986 (EP) .
 0193259 9/1986 (EP) .
 0221024 9/1986 (EP) .
 0228838 7/1987 (EP) .
 305275 * 3/1989 (EP) .
 WO88/08880 11/1988 (WO) .

OTHER PUBLICATIONS

Christinia Hofmann, "The Binding of *Bacillus thuringiensis* Delta-Endotoxin to Cultured Insect Cells and to Brush Border Membrane Vesicles", a dissertation submitted to the Swiss Federal Institute of Technology in Zurich, Switzerland, for the degree of Doctor of Natural Sciences, ADAG Administration & Druck AG, Zurich 1988, Diss. ETH No. 8498.*

A. Devonshire et al., A Carboxylesterase with Broad Substrate Specificity Causes Organophosphorus, Carbamate and Pyrethroid Resistance in Peach—Potato Aphids (*Myzus persicae*) *Pesticide Biochemistry and Physiology* (1982) 18:235–246.

C. Hofmann et al., "Specificity of *Bacillus thuringiensis* – endotoxins is Correlated With the Presence of High-Affinity Binding Sites in the Brush Border Membrane of Target Insect Midguts", *Proc. Natl. Acad. Sci. USA* (1988) 85:7844–7848.

Van Mellaert et al "Binding of Different Types of *Bacillus thuringiensis* Delta-Endotoxins to Midgut Brush Border Membrane Vesicles is Correlated with the Insecticidal Spectrum", XXI Annual Meeting of the Society for Invertebrate Pathology at the University of California, San Diego at La Jolla on Aug. 14–18, 1988.

M. Vaeck et al., "Transgenic Plants Protected From Insect Attack", *Nature* 328:33–37 (1987).

C. Payne, "Current Uses and Future Prospects for Microbial Pest Control Agents", *Med. Fac. Landbouww. Rijksuniv., Gent*, 52(2a), 1987, pp. 113–123.*

G. Mani, "Evolution of Resistance in the Presence of Two Insecticides", *The Genetics Society of America*, Nov. 1985, pp.761–783.*

"Simultaneous Expression of Two Kinds of Insecticidal Proteins," *Patent Abstracts of Japan*, vol. 13, No. 326, (1989) C–620.

"A Translation Fusion Product of Two Different Insecticidal Crystal Protein Genes of *Bacillus thuringiensis* Exhibits an Enlarged Insecticidal Spectrum" *Chemical Abstracts*, vol. 112, No. 21 (1990), p. 262, 193742F.

"Binding of the Delta Endotoxin From *Bacillus thuringiensis* to Brush Border Membrane Vesicles of the Cabbage Butterfly (*Pieris brassicae*)", *Eur. J. Biochem*, vol. 173 (1988), pp. 85–91.

"Specificity of *Bacillus thuringiensis* Delta-Endotoxins is Corrected With The Presence of High-Affinity Binding Sites in the Brush Border Membrane of Target Insect Midgut", *Proc. Natl. Acad. Sci.*, vol. 85, (1988), pp. 7844–7848.

"Chimera Insecticidal Protein of *Bacillus thuringiensis*", *Patent Abstracts of Japan*, vol. 12, No. 391 (1988) (C–537).

* cited by examiner

Primary Examiner—Amy Nelson

(74) Attorney, Agent, or Firm—Burns, Doane, Swecker & Mathis, L.L.P.

(57) **ABSTRACT**

Plants made resistant to insects by transforming their nuclear genome with two or more DNA sequences, each encoding a different non-competitively binding *B. thuringiensis* protoxin or insecticidal part thereof, preferably the toxin thereof.

31 Claims, 55 Drawing Sheets



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

REQUEST FOR FILING CONTINUATION/DIVISIONAL
APPLICATION UNDER 37 C.F.R. § 1.53(b)

Box PATENT APPLICATION
Assistant Commissioner for Patents
Washington, D.C. 20231

Sir:

This is a request for filing a ☐ continuation ☒ divisional application under 37 C.F.R. § 1.53(b) of pending Application No. 09/176,320 filed on October 19, 1998, for RECOMBINANT PLANT EXPRESSING NON-COMPETITIVELY BINDING Bt INSECTICIDAL CRYSTAL PROTEINS, by the following named inventor(s):

- (a) Full Name Herman VAN MELLAERT
- (b) Full Name Johan BOTTERMAN
- (c) Full Name Jeroen VAN RIE
- (d) Full Name Henk JOOS

☒ The entire disclosure of the prior application from which a copy of the oath or declaration is supplied herewith is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

☐ This application is being filed by less than all the inventors named in the prior application. In accordance with 37 C.F.R. 1.63(d)(2), the Commissioner is requested to delete the name(s) of the following person or persons who are not inventors of the invention being claimed in this application.

- (a) Full Name _____
- (b) Full Name _____
- (c) Full Name _____

☐ This application is being filed by more than all the inventors named in the prior application. In accordance with 37 C.F.R. 1.63(d)(2), the Commissioner is requested to add the name(s) of the following person or persons who are inventors of the invention being claimed in this application.


21839

9/13/00
CS

- (a) Full Name _____
(b) Full Name _____
(c) Full Name _____

1. ☒ Enclosed is a copy of the prior Application No. 09/176,320 as originally filed on October 22, 1998, including copies of the specification, claims, drawings and the executed oath or declaration as filed.
2. ☐ Enclosed is a revised prior application and a copy of the prior executed oath or declaration as filed. No new matter has been added to the revised application.
3. ☐ _____ statement(s) claiming small entity status ☐ are enclosed ☐ were filed in prior Application No. __, filed on __.
4. ☒ The filing fee is calculated below ☒ and in accordance with the enclosed preliminary amendment:

CLAIMS					
	NO. OF CLAIMS		EXTRA CLAIMS	RATE	FEE
Basic Application Fee					\$690.00 (101)
Total Claims	7	MINUS 20 =	---	x \$18.00 (103) =	
Independent Claims	2	MINUS 3 =	---	x \$78.00 (102) =	
If multiple dependent claims are presented, add \$260.00 (104)					
Total Application Fee					\$690.00
If small entity status is claimed, subtract 50% of Total Application Fee					
Add Assignment Recording Fee of if Assignment document is enclosed					
TOTAL APPLICATION FEE DUE					\$690.00

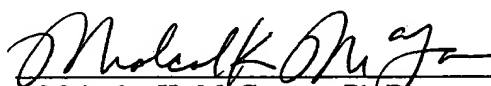
5. ☐ Charge \$ _____ to Deposit Account No. 02-4800 for the fee due.

6. ☒ A check in the amount of \$ 690.00 is enclosed for the fee due.
7. ☒ The Commissioner is hereby authorized to charge any appropriate fees under 37 C.F.R. §§ 1.16, 1.17 and 1.21 that may be required by this paper, and to credit any overpayment, to Deposit Account No. 02-4800. This paper is submitted in duplicate.
8. ☒ Cancel in this application original claims 2-19 of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
9. ☒ Amend the specification by inserting before the first line the sentence: --This application is a ☐ continuation, ☒ divisional, of Application No. 09/176,320, filed October 22, 1998, which is a divisional of Application No. 08/465,609, filed June 5, 1995, which is a continuation of Application No. 08/173,274, filed December 23, 1993, which is a continuation of Application No. 07/640,400, filed January 22, 1991.--
10. ☐ Transfer the drawings from the pending prior application to this application and abandon said prior application as of the filing date accorded this application. A duplicate of this paper is enclosed for filing in the prior application file. (May only be used if signed by person authorized under 37 C.F.R. § 1.138 and before payment of issue fee.)
11. ☒ New drawings are enclosed.
12. ☒ Priority of Application No. 89401499.2 filed on May 31, 1989 in United Kingdom (country) and of PCT/EP90/00905 filed on May 30, 1990 is claimed under 35 U.S.C. § 119.
- ☒ The certified copy of the priority application
- ☐ is enclosed
- ☒ was filed on _ in prior Application No. 07/640,400, filed on January 22, 1991
- ☐ has not yet been filed.
13. ☒ A preliminary amendment is enclosed.
14. ☒ An Information Disclosure Statement is enclosed.
15. ☐ A General Authorization for Payment of Fees and Petitions for Extensions of Time is enclosed.
16. ☒ Also enclosed Request for Transfer of Computer Sequence Listing with paper copy.
17. ☒ The power of attorney in the prior application is to R. Danny Huntington.
- a. ☒ The power appears in the original papers in the prior application.
- b. ☐ Since the power does not appear in the original papers, a copy of the power in the prior application is enclosed.

- c. ☒ Recognize as Associate Attorney Malcolm K. McGowan, Ph.D., Reg. No. 39,300.
- d. ☒ Address all future communications to: (May only be completed by applicant, or attorney or agent of record.)

R. Danny Huntington, Esq.
BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404

Date: September 13, 2000
Date

By: 
Malcolm K. McGowan, Ph.D.
Registration No. 39,300

ADDRESS OF
SIGNATOR:

BURNS, DOANE, SWECKER & MATHIS, L.L.P.
P.O. Box 1404
Alexandria, Virginia 22313-1404
(703) 836-6620

- ☐ inventor(s)
☐ assignee of complete interest
☐ attorney or agent of record
☒ filed under 37 C.F.R. § 1.34(a)